REMARKS

This application has been reviewed in light of the Office Action dated May 16, 2006. Claims 1-32 are pending in the application. By the present amendment, claims 11, 21, 30 have been amended. No new matter has been added. The Examiner's reconsideration of the rejection in view of the amendment and the following remarks is respectfully requested. No new issues have been raised by the amendments.

The Examiner stated that the previous arguments were considered and <u>are</u> persuasive. However, the rejection with regard to U.S. Application 2005/066301 to Lorenz et al. (hereinafter Lorenz) was repeated verbatim. In addition, the new ground for rejection was only made against claim 32. However, in the remarks section the Examiner states that Lorenz, Corson et al. (US Patent No. 6,629,292) and the combination thereof are used to maintain the rejection of claims 1-32. The Office Action is contradictory and difficult to decipher. The Examiner is respectfully requested to vacate the Final Rejection and clarify the rejections.

In order for this Office Action to be responsive, the Applicant has attempted to interpret the rejections to provide an appropriate response.

By the Office Action, the Examiner objected to claims 11, 21, and 30 to reword the claims. While it is believed unnecessary to make the requested changes, the Applicant has amended claims 11, 21 and 30 as an accommodation to the Examiner.

As interpreted by the Applicant, the Examiner further rejected claims 11, 21 and 30 under 35 USC §101 and stated that these claims should include all of the steps of their corresponding independent claim since during the course of prosecution the independent claims may be amended or cancelled.

The Applicant strongly disagrees that such an amendment is necessary. As previously stated, claims 11, 21 and 30 already include all of the limitations of the base claim. It is therefore, respectfully submitted that claims 11, 21 and 30 are in proper dependent form and further limit the methods of claims 1, 13 and 23, respectively and include all of the limitations of the independent claims from which they depend. None of the other dependent claims were required or should be required to include all of the listed steps of the independent claims. This is handled by virture of their dependent relationship. In fact to do so would be redundant and improper. Reconsideration is earnestly solicited.

By the Office Action, claims 1-11, 13-21 and 23-30 stand rejected under 35 U.S.C. §102 (e) as being anticipated by U.S. Patent Application No. 2005/0066301 to Lorenz et al. (hereinafter Lorenz).

The Applicants again respectfully disagree with the rejection.

AS STATED PREVIOULSY, Lorenz is directed to finite element methods where a mesh generation tool is integrated within a system to provide a mesh of finite elements. The finite elements may be generated for devices provided in a schematic diagram for a circuit. The mesh generation tool permits the user to act at a system level (entire design) or component level (individual component) and provide a mesh tool that works in both regimes. The mesh tool can have its density changed but the mesh does not measure the density of the circuit and the Examiner contends.

Lorenz has nothing to do with the methodology or approach of the present invention. While both analyze circuit designs, Lorenz takes a completely different approach (finite element analysis of a circuit) than the present invention which first translates a design to a

pixel map and then analyzes the pixel map.   Lorenz and the present invention ARE

FUNDAMENTALLY different inventions.

Lorenz does not define properties of a portion of the circuit and render these

properties as an intensity of a representative pixel.

The Examiner makes a fundamental error in equating a mesh with a pixel. A

mesh is NOT a pixel. A mesh is a rendering of a netlike structure over a surface to attempt to

approximate spatial portions of the physical structure. A mesh requires many pixels to render it

on a display and the mesh itself does not represent the quantity being analyzed. A pixel is a dot

having color or intensity. These concepts are not equivalent and are not equivalently used in

Lorenz and the present claims. The Examiner incorrectly applies Lorenz to the present claims to

the detriment of the Applicant since the case now has a final rejection.

In Lorenz, a mesh is generated over the entire circuit and the mesh elements are

employed for a partial differential equation analysis. This is a standard implementation of finite

element analysis and does not contemplate the analysis techniques developed by the present

inventors. Lorenz uses finite element analysis and boundary element analysis (which depicts

spatial attributes of the circuit) to determine physical characteristics (e.g., stress) of a circuit

under loading conditions, which may be assumed or generated as hypotheticals.

In stark contrast, the present invention takes a portion of a circuit/chip and

represents that portion as a pixel. The entire section or area of the chip/circuit is rendered as a

PIXEL. THIS IS NOT A MESH! The pixel intensity (color, shade, etc.) is employed to define a

property that the portion of the circuit/chip represents. For example, ONE PIXEL represents an

entire area of the circuit design and its intensity represents a property of that entire area. This is

clearly not contemplated by Lorenz. The present claims should be allowable for at least this reason.

The pixels are employed to evaluate the design of the circuit, e.g., based on the appearance of a pixel map. Nowhere in Lorenz is such a concept disclosed or suggested. The claims as presented are believed to be in condition for allowance over Lorenz since Lorenz is believed not to teach all of the elements of the claims.

For example, Lorenz fails to disclose or suggest:

-discretizing a design representation into pixel elements representative of a structure in the design where each pixel element represents a portion of the design,

-determining at least one property for each pixel element representing the portion of the design where the at least one property is represented by an intensity of the pixel element,

-determining a response of the design due to local properties across the design based upon representations of the pixel elements.

Lorenz does not represent portions of the design with pixel elements where each pixel element represents a portion of the design.

Lorenz does not determine at least one property for each pixel element where the at least one property is represented by an intensity of the pixel element.

Lorenz does not determine a response based upon representations of the pixel elements.

Lorenz takes a design and overlays a mesh of finite elements over the design. Portions of the design are not discretized as pixel elements but are outlined in finite elements (DEFINED BY MESHES) used as input to a PDE solver. Lorenz may however calculate a response and color pixels to show the calculated quantities. But again this is completely different and does not in any way contemplate the present claims.

Claim 1 includes, *inter alia*, a method for analyzing circuit designs including discretizing a design representation into pixel elements representative of a structure in the design where each pixel element represents a portion of the design, determining at least one property for each pixel element representing the portion of the design where the at least one property is represented by an intensity of the pixel element, and determining a response of the design due to local properties across the design based upon representations of the pixel elements.

The intensity of the pixel elements is what is employed to be analyzed in the current claims. In other words, the design and its existing properties are reduced to a pixel element that represents these properties. Then, a map of these pixel elements (see e.g., FIGS. 4-6 of the present disclosure) is used for an analysis of the design. This is completely different from the teachings of Lorenz. It is further suggested that Lorenz is incorrectly applied to the present claims.

Similar reasoning is applicable to claims 13 and 23. Claims 1, 13, and 23 are therefore believed to be in condition for allowance for at least the reasons stated. Claims 2-12, 14-22 and 24-31 are also believed to be in condition for at least the stated reasons and due to their dependencies from claim 1, 13 and 23, respectively.

Other reasons may exist for allowing claims 2-12, 14-22 and 24-31 as well. For example, claims 7, 17 and 26 essentially recite that the property includes metal fraction and the global response includes thermal strain. Nowhere in Lorenz is metal fraction disclosed or suggested as a parameter or as a physical quantity used in performing calculations.

Again, this typifies the stark differences between the method of Lorenz and the present invention. While the present invention takes features of the design and reduces these features to a pixel element, Lorenz merely places a mesh on the device being analyzed and calculates physical parameters using the mesh and a PDE solver.

These differences are also highlighted in claims 10, 20 and 29 which essentially recite: representing a three-dimensional multi-layered design in two dimensions such that properties within all layers are accumulated and represented in the two-dimensional image. Several layers a design can be reduced into a two-dimensional pixel map for analysis in accordance with the present invention. This is not disclosed or suggested anywhere in Lorenz.

It is believed that the Examiner has overlooked these claims and their differences over Lorenz. For at least the reasons set forth above, the present claims are believed to be in condition for allowance. Early and favorable consideration is earnestly solicited.

By the Office Action, claims 32 stands rejected under 35 U.S.C. §102 (e) as being anticipated by U.S. Patent No. 6,629,292 to Corson et al. (hereinafter Corson).

Corson includes applying a gray scale image onto a surface of a semiconductor substrate in segments where the width of a line varies with gray scale level. Corson is completely different from the present claims and fails to anticipate the present invention. Corson starts with an image and adapts the image to be rendered on a chip. The present

invention creates a pixel map to transform a chip design to analyze the design using the map not an image of the design.

Claim 1 includes, *inter alia*, a method for analyzing circuit designs including discretizing a design representation into pixel elements representative of a structure in the design where each pixel element represents a portion of the design, determining at least one property for each pixel element representing the portion of the design where the at least one property is represented by an intensity of the pixel element, and determining a response of the design due to local properties across the design based upon representations of the pixel elements.

The concepts and recitation of elements of the present claims are not even suggested by Corson. For example, Corson does not determine a response of the design due to local properties across the design based upon representations of the pixel elements. Claim 32 is believed to be in condition for allowance for at least the stated reasons. Early and favorable consideration is earnestly solicited.

Assuming that the Examiner rejected claims 1-32 based on combining Lorenz and Corson in an obvious type rejection under 35 §USC 103(a) based on the REMARKS in the Office Action, the cited combination lacks proper motivation to combine the references. For example, Lorenz analyzes a design after it has been created, and Corson applies a design to a substrate using a gray scale technique. Lorenz uses finite element tools to analyze the design, and Corson is concerned with applying a design to a substrate. It is not clear how, absent the present claims, one skilled in the art would be motivated to combine these references and how one skilled in the art would combine the teachings to arrive at the present invention.

However, even if, *arguendo*, these references were properly combined, neither reference alone or in combination discloses or suggests at least: determining a response of the design due to local properties across the design based upon representations of the pixel elements as recited in the present claims. This combination of references therefore would fail to disclose all the elements of the present invention as claimed. Therefore, an obviousness-type rejection would fail. The Examiner is respectfully requested to identify and support the rejections, if any.

By the Office Action, claims 12, 22, 31 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Lorenz in view of Corson.

The Applicant repeats that arguments set forth above. Claims 12, 22, and 31 are believed to be in condition for allowance at least due to their dependencies on allowable base claims. It is further noted that the metal fraction property and its implementation in the present claims is not disclosed or suggested by the cited references.

For at least the reasons set forth above, the present claims are believed to be in condition for allowance. Early and favorable consideration is earnestly solicited.

It is apparent that many issues remain in this case. It is respectfully requested that the Examiner call the undersigned to discuss the remaining issues and to gain a better understanding of the Applicant's position.
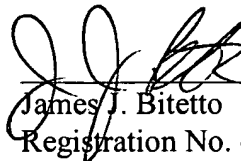
In view of the foregoing amendments and remarks, it is respectfully submitted that all the claims now pending in the application are in condition for allowance. Early and favorable reconsideration of the case is respectfully requested.

In the event that any additional fees or charges are required at this time in connection with the application, they may be charged to applicant's IBM Deposit Account No. 50-0510.

Respectfully submitted,

Date: 7/14/06

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